HEAD MOTION ESTIMATION FROM FOUR FEATURE POINTS

ABSTRACT OF THE DISCLOSURE

Linear method for performing head motion estimation from facial feature data, the method comprising the steps of: obtaining first facial image and detecting a head in the first image; detecting position of four points P of said first facial image where $P = \{\mathbf{p}_1, \mathbf{p}_2, \mathbf{p}_3, \mathbf{p}_4\}$, and $\mathbf{p}_k = (x_k, y_k)$; obtaining second facial image and detecting a head in the second image; detecting position of four points P' of the second facial image where $P' = \{\mathbf{p}_1', \mathbf{p}_2', \mathbf{p}_3', \mathbf{p}_4'\}$ and $\mathbf{p}_k' = (x_k', y_k')$; and, determining the motion of the head represented by a rotation matrix R and translation vector T using the points P and P'.

The head motion estimation is governed according to an equation:

$$\mathbf{P}_i' = R\mathbf{P}_i + \mathbf{T}, \qquad \text{where} \quad R = \begin{bmatrix} \mathbf{r}_1^T \\ \mathbf{r}_2^T \\ \mathbf{r}_3^T \end{bmatrix} = \left[r_{ij} \right]_{3\times 3} \quad \text{and} \quad \mathbf{T} = \begin{bmatrix} T_1 & T_2 & T_3 \end{bmatrix}^T$$

represents camera rotation and translation respectively.

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